

FINAL

CHESAPEAKE BAY

TOTAL MAXIMUM DAILY LOAD ACTION PLAN

FOR

JOINT BASE LANGLEY EUSTIS – EUSTIS



Prepared For:

Air Force Civil Engineer Center (AFCEC)
772nd Enterprise Sourcing Squadron/PKA
2261 Hughes Avenue, Suite 163
JBSA, Texas 78236-9861

733d CED
JBLE–Eustis
1407 Washington Blvd
JBLE–Eustis, Virginia 23604

Prepared By:

AECOM

AECOM Technical Services, Inc.
1600 Perimeter Park Drive, Suite 400
Morrisville, NC 27560

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LIST OF ABBREVIATIONS AND ACRONYMS

AIT	Advanced Individual Training
ATSC	Army Training Support Center
BMP	Best Management Practice
CED	Civil Engineering Division
DBH	Diameter at breast height
VDEQ	Virginia Department of Environmental Quality
EOS	Edge of Stream
EPA	Environmental Protection Agency
GIS	Geographic information system
HSG	Hydrologic soil group
JBLE-Eustis	Joint Base Langley-Eustis – Eustis
JRRF	James River Reserve Fleet
MARAD	Maritime Administration
MCM	Minimum Control Measures
MS4	Municipal Separate Storm Sewer System
NCO	Non-commissioned Officer
POC	Pollutant of concern
SWP3	Stormwater Pollution Prevention Plan
TBD	To Be Determined
TMDL	Total Maximum Daily Load
TRADOC	Training and Doctrine Command
TSE	Training Support Enterprise
VPDES	Virginia Pollutant Discharge Elimination System
VSMP	Virginia Stormwater Management Program
WIP	Watershed Implementation Plan

Statement of Limitations

This plan was prepared in accordance with the customary thoroughness and competence of environmental science and engineering consulting professionals and in accordance with the standard for professional services for a national consulting firm at the time these services were provided. The analysis, conclusions, and recommendations expressed in this report were developed based upon a limited scope of services and the information made available at the time this work was conducted.

Chesapeake Bay TMDL Action Plan Requirements Cross-Reference Table		
Guidance Memo 15-2005 Chesapeake Bay TMDL Special Condition Guidance (18 May 2015)		JBLE-Eustis TMDL Action Plan Section
1	Current program and existing legal authority	2.0
2	New or modified legal authority	2.0
3	Means and methods to address discharges from new sources	5.0
4	Estimated existing source loads and calculated total pollutant of concern (POC) required reductions	4.0
5	Means and methods to meet the required reductions and schedule	5.0
6	Means and methods to offset increased loads from new sources initiating construction between 1 July 2009 and 30 June 2014	5.1
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1.0 INTRODUCTION

1.1 Purpose and Objective

In 2010 the United States Environmental Protection Agency (EPA) established the Chesapeake Bay Total Maximum Daily Load (TMDL) to address excess nitrogen, phosphorus, and total suspended solids (pollutants of concern or POCs) in the bay (EPA, 2010). A TMDL is the maximum amount of a pollutant that a waterbody can assimilate and still support its designated use. The Chesapeake Bay watershed encompasses over 64,000 square miles across the District of Columbia and large sections of Delaware, Maryland, New York, Pennsylvania, West Virginia, and Virginia.

In the Phase I and Phase II Chesapeake Bay Watershed Implementation Plan (WIP) for the Chesapeake Bay TMDL, the Commonwealth of Virginia committed to a phased approach to reducing nutrients and suspended solids discharging from Municipal Separate Storm Sewer System (MS4s). Section I.C of the Joint Base Langley-Eustis – Eustis (JBLE-Eustis) MS4 permit (VAR040035, effective 1 July 2013) requires the base to prepare a Chesapeake Bay TMDL Action Plan that demonstrates future plans to meet the required nutrient and suspended solids reductions. The plan must be submitted to the Virginia Department of Environmental Quality (VDEQ) for review and approval.

This Chesapeake Bay TMDL Action Plan was prepared by AECOM Technical Services, Inc. (AECOM) for JBLE–Eustis under Air Force Civil Engineer Center (AFCEC) Contract No. FA8903-08-D-8770, Task Order No. 0311.

The Action Plan is an annual report on the progress made by the base in meeting the Chesapeake Bay TMDL pollutant reduction requirements, specifically the Level 2 (L2) scoping run as specified in the 2010 Phase I WIP (VDEQ, 2010). The L2 reductions are to be met in phases corresponding to the permit cycles, as outlined in Table 1-1.

Table 1-1. Pollutant Percent Reduction Requirements by Permit Cycle

Permit Cycle	Timeframe	Cycle Percent Reduction	Cumulative Percent Reduction
1	2013-2018	5%	5%
2	2018-2023	35%	40%
3	2023-2028	60%	100%

The Action Plan presents the JBLE-Eustis estimated load contribution, required load reductions, and pollutant reduction credits. The plan also reports progress made toward meeting the 5% pollutant reduction requirement for the first permit cycle. The methodology used to calculate the pollutant loads and credits is based on VDEQ Guidance Memo No. 15-2005 (Guidance Document) (VDEQ, 2015).

1.2 Installation Description

JBLE–Eustis, formerly Fort Eustis, is located adjacent to the City of Newport News, Virginia which is part of the Norfolk, Hampton, and Newport News metropolitan area. The base is located on Mulberry Island, a small peninsula bordered by the James River to the west, Warwick River to the east, and Skiffes Creek toward the north. Smaller waterbodies on or bordering the base include Jail Creek, Morrisons Creek, Island Creek, Bailey Creek, and Eustis Lake. The base occupies approximately 8,000 acres and houses a variety of military organizations and support activities on the installation. Most of the development is located at the northern end of the base, while the southern portion of the peninsula remains largely undeveloped. A golf course and an airfield are located near the center of the base. A site location map is presented at Figure 1-1.

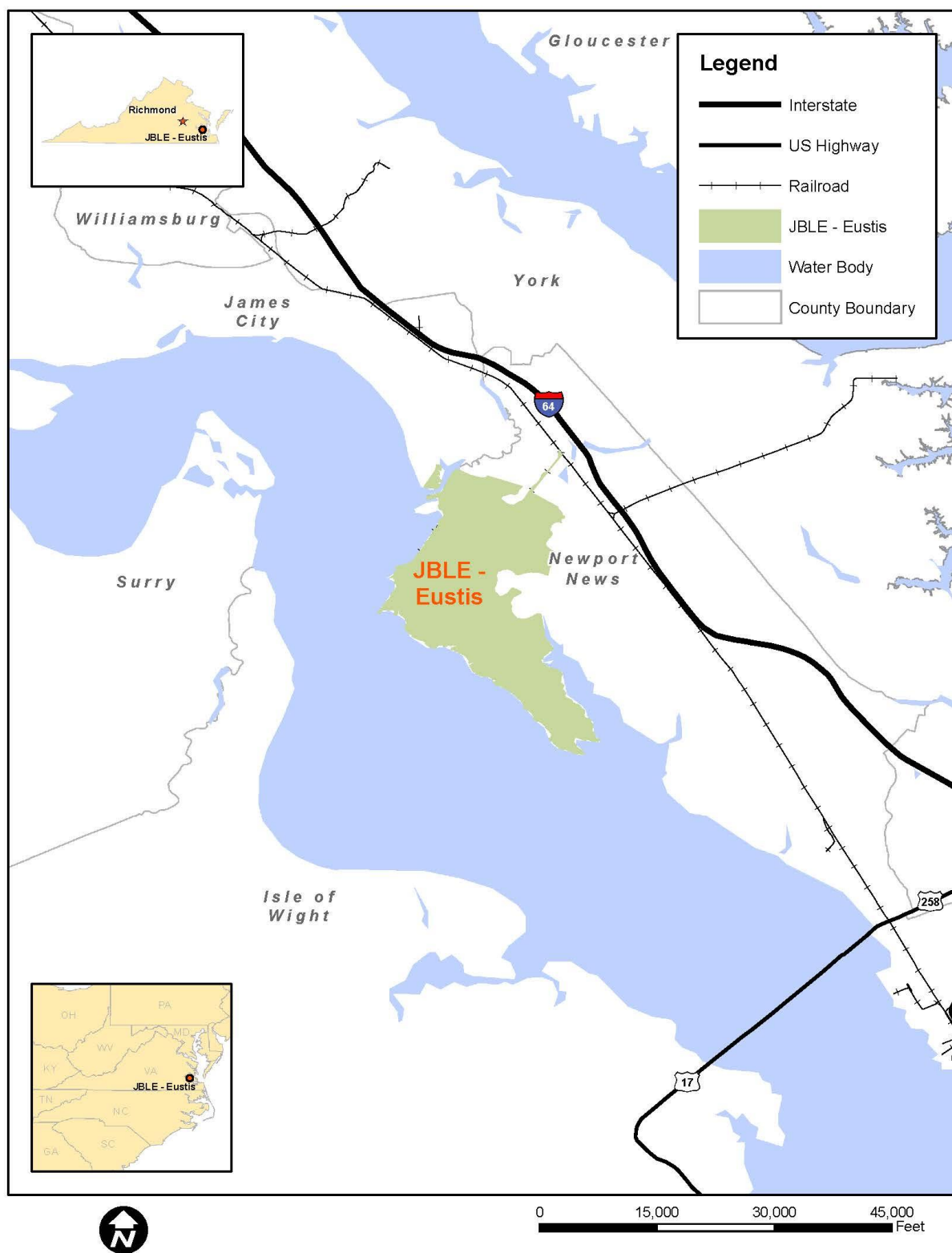


Figure 1-1. Site Location Map, JBLE-Eustis

The base is the home of the Headquarters United States Army Training and Doctrine Command (TRADOC), the Army Training Support Center (ATSC), and the 7th Transportation Brigade (Expeditionary). TRADOC is responsible for developing, educating, and training soldiers and civilians; supporting unit training; and designing, building, and integrating capabilities, formations, and equipment. The ATSC is responsible for managing the Army Training Support Enterprise (TSE), which provides oversight for programs that enable development, delivery, and sustainment of training and education support capabilities. The 7th Transportation Brigade (Expeditionary) provides logistics support around the world for port, terminal, and watercraft units conducting expeditionary operations in support of land operations. Other units on the base include the Army Aviation Logistics School, Non-commissioned Officer's (NCO) Academy, Aviation Applied Technology Directorate, and the James River Reserve Fleet (JRRF). The JRRF, a tenant managed by the Maritime Administration (MARAD), leases land on base and maintains a number of vessels moored in the James River. The total population of the base is approximately 14,550, comprised of approximately 6,800 military personnel and 2,800 dependents living on base, as well as approximately 4,950 civilian non-residents who commute to the base daily.

1.3 Plan Organization

This TMDL Action Plan is organized into the following sections:

- Section 1.0 presents an overview of the plan purpose and objective, installation description, and plan organization.
- Section 2.0 describes the JBLE-Eustis industrial and MS4 stormwater programs.
- Section 3.0 discusses the JBLE-Eustis MS4 service area.
- Section 4.0 provides the load reduction calculations.
- Section 5.0 discusses the pollutant credit calculations.
- Section 6.0 provides a summary of load reductions and credits for the first permit cycle.
- Section 7.0 discusses the public notice and received comments.
- Section 8.0 contains a list of references used during preparation of this plan.

2.0 STORMWATER PROGRAM OVERVIEW

JBLE-Eustis is authorized to discharge stormwater from the installation in accordance with two permits issued by the VDEQ as discussed in the subsections below.

2.1 Industrial Stormwater Program Overview

In November 1990, federal stormwater discharge requirements (known as the Phase I National Pollutant Discharge Elimination System [NPDES] Program) were promulgated as part of the NPDES under the Clean Water Act (55 Federal Register 48062-48901). These regulations, as stated in Title 40 of the Code of Federal Regulations (CFR) Parts 122, 123, and 124, require the owners of "facilities that discharge storm water associated with industrial activity" to apply for a stormwater permit if storm water is discharged to (1) waters of the United States or (2) MS4s.

NPDES permits are issued either by a United States (U.S.) Environmental Protection Agency (EPA) Regional office or by states that have been granted NPDES permitting authority. JBLE–Eustis is located in the Commonwealth of Virginia, which has NPDES permitting authority. VDEQ administers the commonwealth's NPDES program and issues Virginia Pollutant Discharge Elimination System (VPDES) permits. The VDEQ requirements for stormwater permitting, are located in the Virginia Administrative Code (VAC), 9 VAC 25, and are not substantially different from the federal guidelines contained in 40 CFR 122.

A facility is subject to the regulations only if its activities fit the definition of "industrial" as specified by the 11 categories in 40 CFR 122.26(b)(14)(i)-(xi). The industrial stormwater VPDES permit issued to JBLE–Eustis, Permit No. VA0025216 incorporates the definition of industrial activity from 40 CFR 122.26. The primary industrial activities of JBLE–Eustis fall within three sectors: water transportation, land transportation, and air transportation. VPDES Permit No. VA0025216, issued to JBLE–Eustis, includes specific stormwater management requirements for each of these three sectors.

2.2 MS4 Program Overview

Discharges from MS4s are regulated under the Virginia Stormwater Management Act, the Virginia Stormwater Management Program (VSMP) Permit regulations, and the Clean Water Act as point source discharges. MS4 regulations were developed and implemented in two phases. Implementation of the first phase began in the early 1990s and required that operators of MS4s serving populations of greater than 100,000 people (per the 1990 decennial census) apply for and obtain a permit to discharge stormwater from their outfalls. The second phase of MS4 regulations became effective 23 March 2003, and required that operators of small MS4s in "urbanized areas" (as defined by the latest census) obtain a permit to discharge stormwater from their outfalls.

VDEQ issued MS4 Permit No. VAR040035 to JBLE-Eustis which became effective on 1 July 2013. The permit requires JBLE-Eustis to develop, implement, and enforce an MS4 Program designed to reduce the discharge of pollutants from the MS4 to the maximum extent practicable, to protect water quality. The

permit requires the base to implement six minimum control measures (MCMs) or best management practices (BMPs) as follows:

- MCM 1: Public education and outreach on stormwater impacts
- MCM 2: Public involvement/participation
- MCM 3: Illicit discharge detection and elimination
- MCM 4: Construction site stormwater runoff control
- MCM 5: Post-construction stormwater management in new development and development on prior developed lands
- MCM 6: Pollution prevention/good housekeeping for municipal operations

In addition to implementing these MCMs, Section I.C, *Special Condition for the Chesapeake Bay TMDL*, of the MS4 permit VAR040035 requires JBLE-Eustis to prepare a Chesapeake Bay TMDL Action Plan that demonstrates future plans to meet the required nutrient and suspended solids reductions.

Each year the base submits to VDEQ an MS4 Annual Report documenting progress toward implementing the MCMs and special conditions identified in the installation MS4 Program Plan.

3.0 MS4 SERVICE AREA

A determination of the base pollutant load requires an estimate of the area served by the permittee's MS4 as of 30 June 2009. This was accomplished by creating a geographic information system (GIS) land cover shapefile based on 2009 aerial imagery obtained from the Virginia GIS Clearinghouse, <http://vgin.maps.arcgis.com>. The following land cover types were manually delineated across the entire base: impervious, pervious, forest, agriculture (a six acre horse pasture), natural areas (mostly tidal wetlands and marshes), and open water. Impervious area included buildings, roads, parking lots, sidewalks, railroads, and airport runways. Pervious area included turf and landscaped areas. Forested lands included trees with a minimum diameter at breast height (DBH) and a minimum contiguous area of 30 x 30 meters, as specified in the Guidance Document. Land cover features in a shapefile created by Concurrent Technologies Corporation in 2013 were used as a starting point in the land cover delineation process for the Action Plan.

The MS4 service area was conservatively classified as impervious (regulated urban impervious) or pervious (regulated urban pervious). The base is fully covered by the 2000 US Census urban area, so no adjustment to the MS4 service area due to non-overlapping US Census urban area was required. A desktop review of the base topography revealed no receiving/exporting sheetflow runoff from/to an adjacent permittee, so no adjustment to the MS4 service area was necessary.

The Guidance Document allows for land covered under another VPDES permit to be excluded from the MS4 service area. Portions of the base were covered under industrial permit VA0025216 on 30 June 2009. The industrial drainage areas covered under permit VA0025216 were delineated to account for this area. The industrial drainage area shapefile was then combined with the 2009 land cover shapefile using the ArcGIS Union tool to produce the final 2009 land cover shapefile. The industrial areas were not included in the MS4 service area.

The land cover delineation process outlined above was repeated using 2014 aerial imagery commissioned by the base. This aerial imagery was selected as it has a greater spatial resolution than the 2013 imagery available on the Virginia GIS Clearinghouse website. The 2014 land cover layer was then combined with the industrial layer to identify “unregulated areas.” The final 2014 land cover layer was used to help calculate loads due to New Sources (see section 4.2) and BMP credits (see section 5). A summary of the base's land cover is presented in Table 3-1.

Table 3-1. Land Cover Summary for the 2009 and 2014 Timeframes

Land Use	Acres (2009)	Acres (2014)
Regulated Urban Impervious	559.2	608.6
Regulated Urban Pervious	1,201.9	1,312.6
Forest	2,487.2	2,258.0
Pasture	6.1	6.1
Natural Area	2,869.3	2,838.3
Water	431.5	522.3
Unregulated Impervious	227.8	244.5
Unregulated Pervious	119.4	129.3
Unregulated Forest	36.2	16.8
Unregulated Pasture	12.6	12.6
Unregulated Natural Area	1.2	3.0
Unregulated Water	1.2	1.4
Total	7,953.6	7,953.6

Maps of the industrial permitted areas, 2009 land cover, MS4 service area, and 2014 land cover are presented as Figures 3-1 through 3-4, respectively.

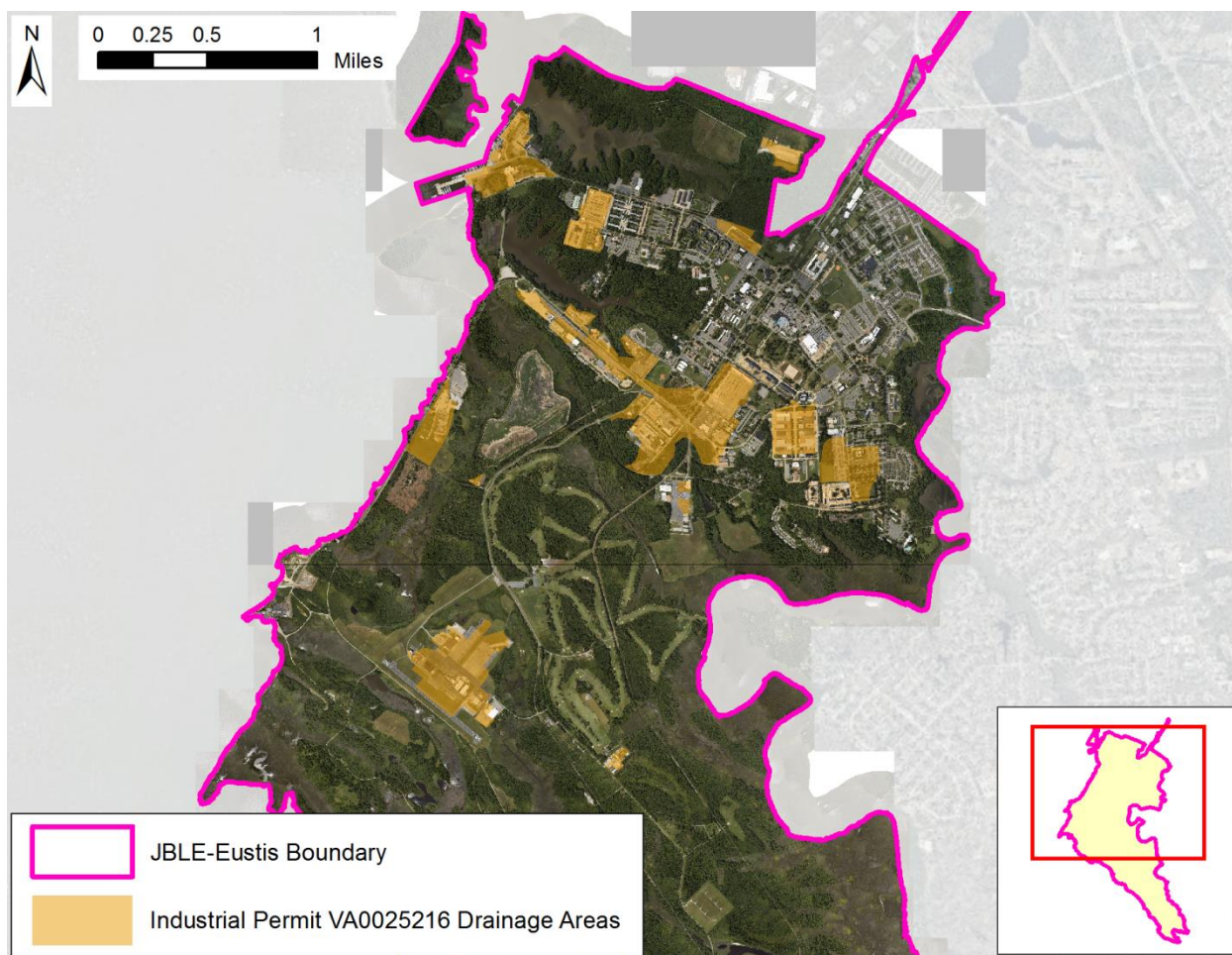


Figure 3-1. JBLE-Eustis Industrial Permit VA0025216 Drainage Areas

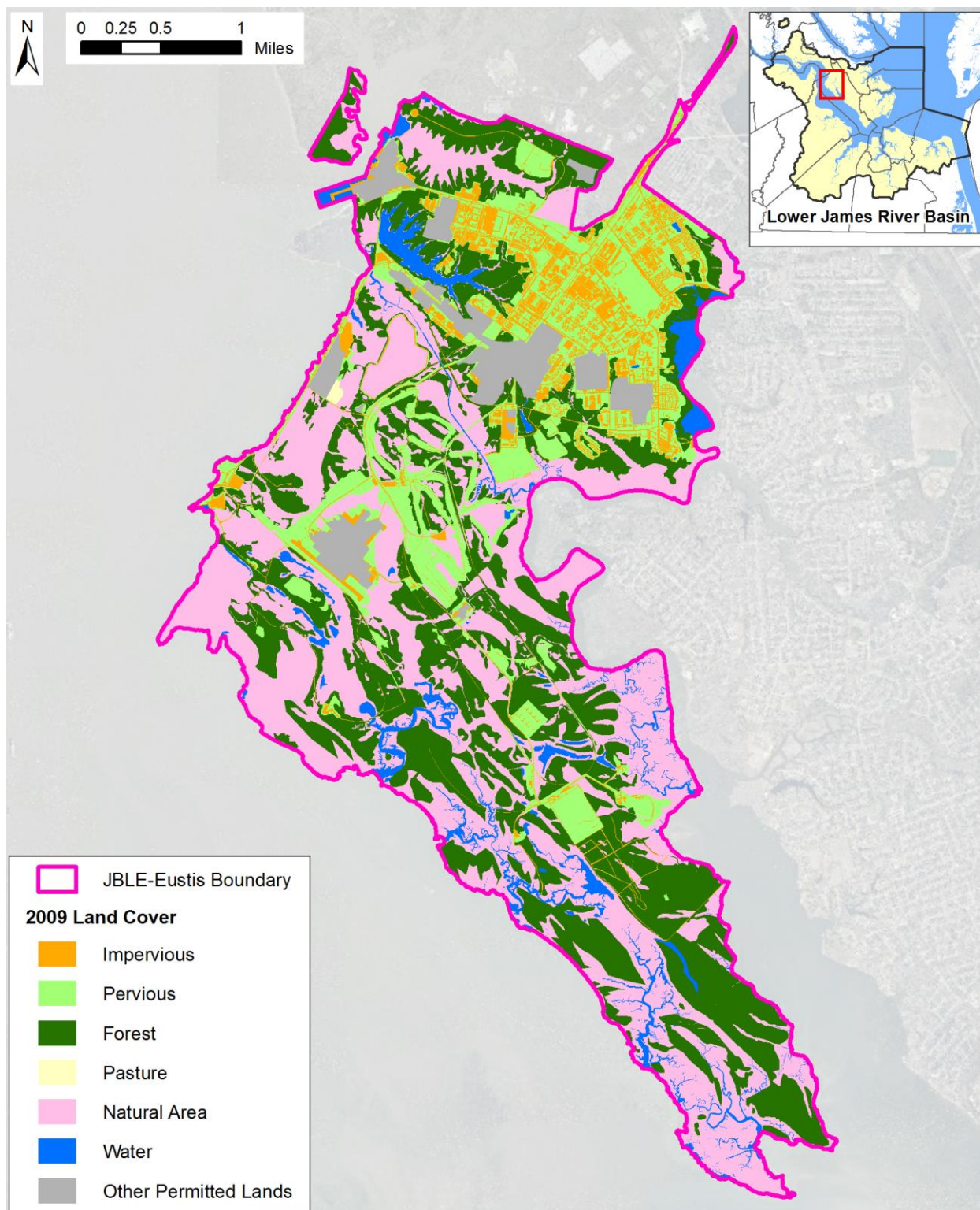


Figure 3-2. JBLE–Eustis Land Cover Present During 2009

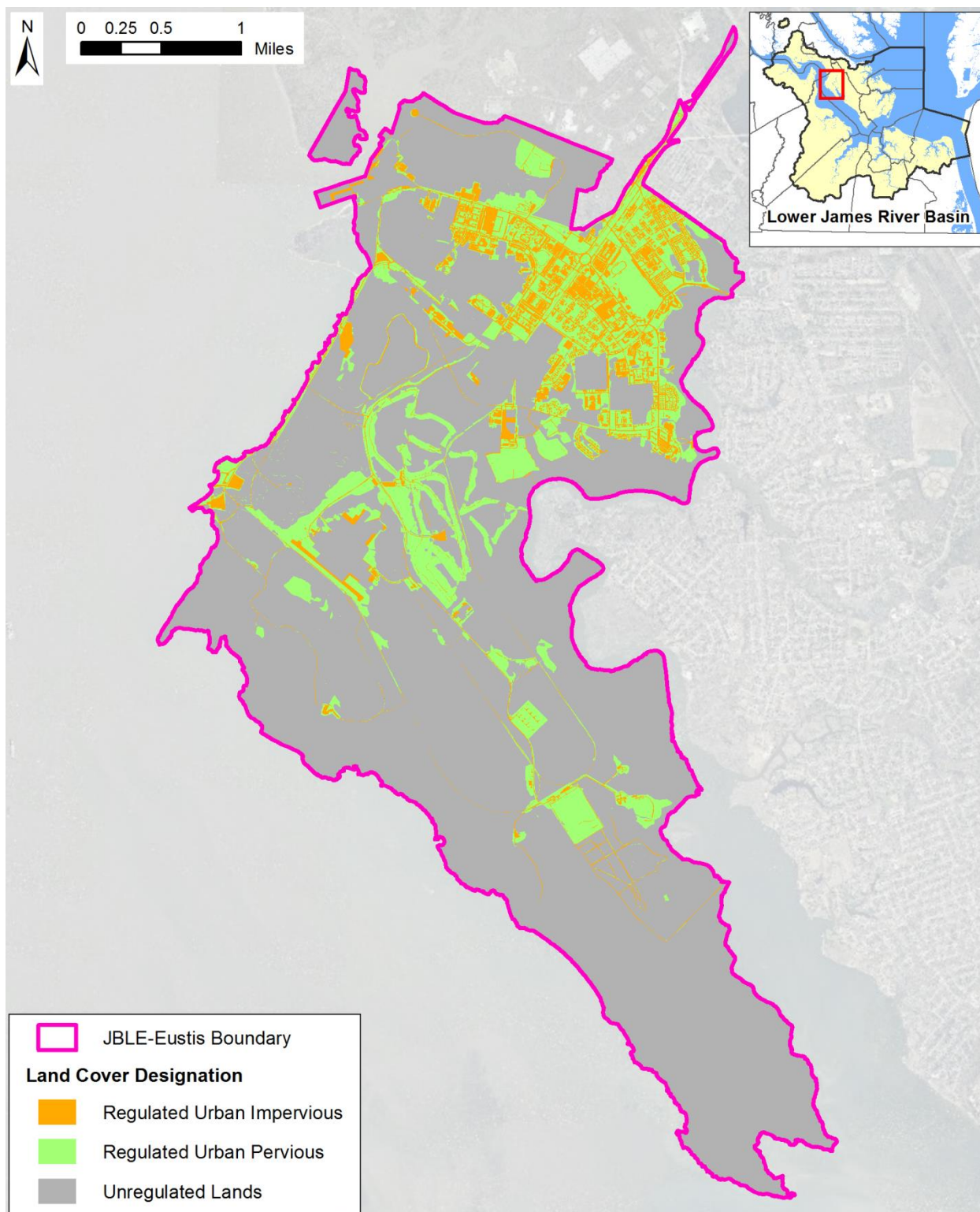


Figure 3-3. JBLE–Eustis MS4 Service Area

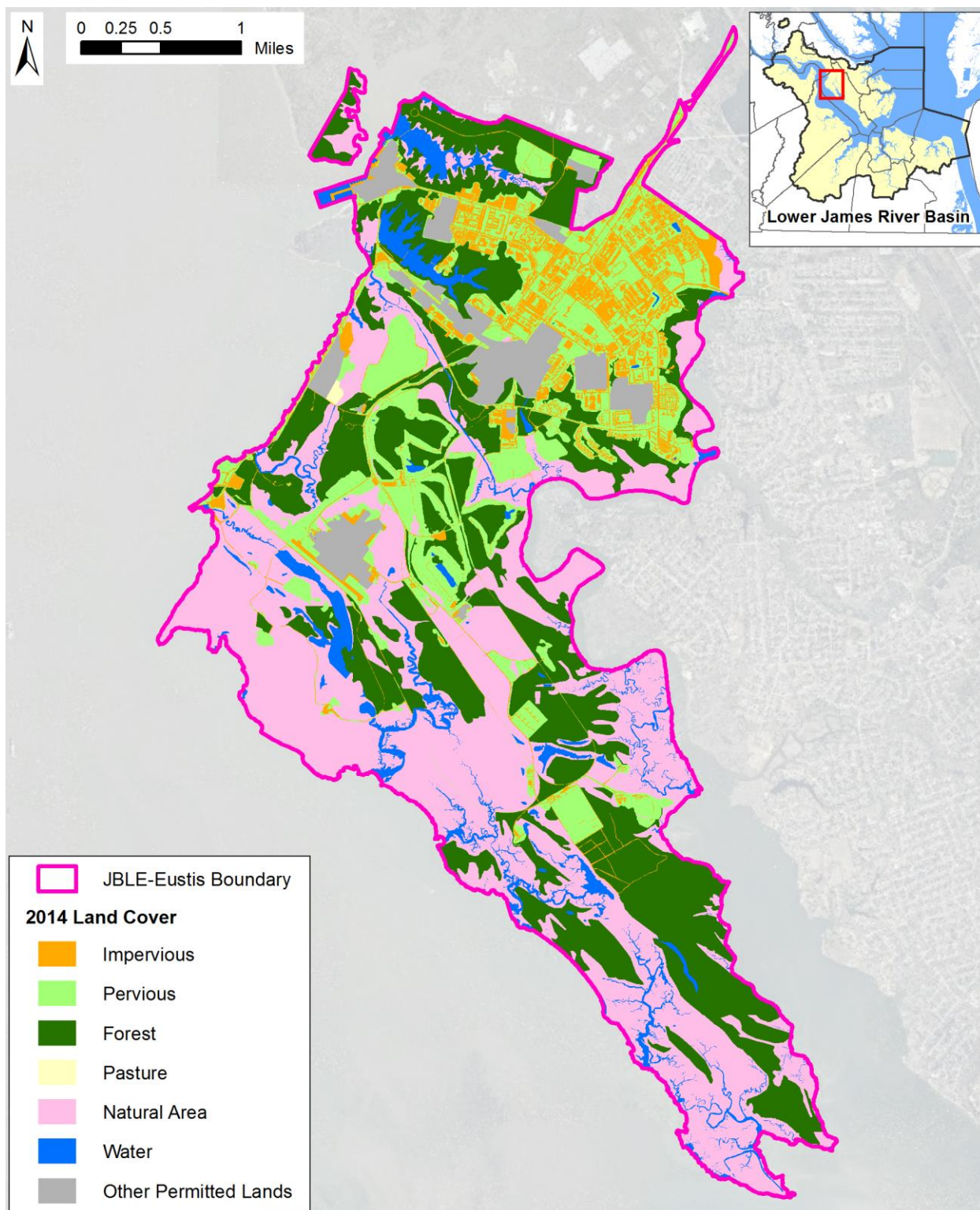


Figure 3-4. JBLE–Eustis Land Cover Present During 2014

4.0 LOAD REDUCTION CALCULATIONS

Pollutant load reductions for existing sources (contributed by the base as of 30 June 2009), new sources (contributed by the base between 1 July 2009 and 30 June 2014), and grandfathered projects are discussed in the subsections below.

4.1 Existing Source Loads

The Existing Source loads for the base (i.e., the pollutant loads contributed by the base as of 30 June 2009) were calculated using the land cover loading rates from Table 2a (James River Basin) and the Table 2b template of the Guidance Document, as presented in Table 4-1.

Table 4-1. Existing Source Loads [Table 2a]

Land Cover (Subsource)	Pollutant	Total Existing Acres Served by MS4 (30 June 2009)	2009 EOS Loading Rate (lb/ac/yr)	Estimated Total POC Load Based on 2009 Progress Run (lb/yr)	
Regulated Urban Impervious	Nitrogen	559.2	9.39	5,251.3	13,652.4
Regulated Urban Pervious		1,201.9	6.99	8,401.2	
Regulated Urban Impervious	Phosphorus	559.2	1.76	984.3	1,585.2
Regulated Urban Pervious		1,201.9	0.50	600.9	
Regulated Urban Impervious	Total Suspended Solids	559.2	676.94	378,571.0	500,057.5
Regulated Urban Pervious		1,201.9	101.08	121,486.5	

Notes:

Minor calculation discrepancies are accounted for in rounding.

EOS – Edge of Stream

The required reductions for the first permit cycle (5%) were calculated using Guidance Document Table 3a and the corrected loading rates provided on page seven of the Guidance Document, as presented in Table 4-2.

Table 4-2. First Permit Cycle Required Load Reductions From Existing Source Loads [Table 3a]

Land Cover (Subsource)	Pollutant	Total Existing Acres Served by MS4 (30 June 2009)	First Permit Cycle Required Reduction in Loading Rate (lb/ac/yr)	Total Reduction Required in the First Permit Cycle (lb/yr)	
Regulated Urban Impervious	Nitrogen	559.2	0.0422550	23.6	48.8
Regulated Urban Pervious		1,201.9	0.0209700	25.2	
Regulated Urban Impervious	Phosphorus	559.2	0.0140800	7.9	10.1
Regulated Urban Pervious		1,201.9	0.0018125	2.2	
Regulated Urban Impervious	Total Suspended Solids	559.2	6.7694000	3,785.7	4,317.2
Regulated Urban Pervious		1,201.9	0.4422250	531.5	

4.2 New Source Loads

In addition to the Existing Source loads, the base is required to offset any additional New Source loads from development that was initiated between 1 July 2009 and 30 June 2014. The New Source loads for the base were calculated using the aggregate accounting method presented in Appendix II of the Guidance Document. As the first step, the 2014 pollutant loads were calculated using Table II.3 in the Guidance Document, as presented in Table 4-3.

Table 4-3. New Sources Loads [Table II.3]

Land Cover (Subsource)	Pollutant	Total Existing Acres Served by MS4 (1 July 2014)	2009 EOS Loading Rate (lb/ac/yr)	Estimated Total POC Load as of 1 July 2014 (lb/yr)	
Regulated Urban Impervious	Nitrogen	608.6	9.39	5,714.9	14,889.9
Regulated Urban Pervious		1,312.6	6.99	9,175.0	
Regulated Urban Impervious	Phosphorus	608.6	1.76	1,071.2	1,727.5
Regulated Urban Pervious		1,312.6	0.50	656.3	
Regulated Urban Impervious	Total Suspended Solids	608.6	676.94	411,996.4	544,672.7
Regulated Urban Pervious		1,312.6	101.08	132,676.4	

Notes:

Minor calculation discrepancies are accounted for in rounding.

EOS – Edge of Stream

The difference or Total Load Change between 2009 (refer back to Table 4-1) and 2014 was calculated using Table II.4 in the Guidance Document, as presented in Table 4-4.

Table 4-4. Load Changes From New Sources Using the Aggregate Accounting Method [Table II.4]

Land Cover (Subsource)	Pollutant	Estimated Total POC Load as of 1 July 2014 (lb/yr)	Estimated Total POC Load as of 30 June 2009 (lb/yr)	Total Load Change (lb/yr)	
Regulated Urban Impervious	Nitrogen	5,714.9	5,251.3	463.7	1,237.5
Regulated Urban Pervious		9,175.0	8,401.2	773.8	
Regulated Urban Impervious	Phosphorus	1,071.2	984.3	86.9	142.3
Regulated Urban Pervious		656.3	600.9	55.4	
Regulated Urban Impervious	Total Suspended Solids	411,996.4	378,571.0	33,425.4	44,615.2
Regulated Urban Pervious		132,676.4	121,486.5	463.7	

Notes:

Minor calculation discrepancies are accounted for in rounding.

Using Table II.5 in the Guidance Document, the Total Load Change from Table 4-4 is adjusted by any credits earned from BMPs implemented during the 2009–2014 timeframe to arrive at the Net Load Change. BMPs installed after 1 July 2009 were included in this analysis when they were implemented under conditions of redevelopment, as described in Appendix V.E of the Guidance Document. Please refer to section 5.2 for additional information concerning credits from existing BMPs earned during the 2009–2014 timeframe. The base is required to offset 5% of the Net Load Change by the end of the first permit cycle, as shown in Table 4-5.

Table 4-5. Net Load Changes From New Sources [Table II.5]

Pollutant	Total Load Change (lb/yr)	Reductions from BMPs Installed between 1 July 2009 and 30 June 2014 (lb/yr)	Net Load Change (lb/yr)	Required Reduction during First Permit Cycle	Additional Reductions Required by the End of the First Permit Cycle (lb/yr)
Nitrogen	1,237.5	109.4	1,128.0	5%	56.4
Phosphorus	142.3	27.0	115.3	5%	5.8
Total Suspended Solids	44,615.2	16,906.7	27,708.6	5%	1,385.4

Notes:

Minor calculation discrepancies are accounted for in rounding.

4.3 Grandfathered Project Loads

Grandfathered Projects are those in accordance with 9VAC25-870-48 (<https://lis.virginia.gov/cgi-bin/legp604.exe?000+reg+9VAC25-870-48>) (previously numbered 4VAC50-60-48) with a state permit issued after 1 July 2014, land disturbance activities commencing after 1 July 2014 that disturb one acre or greater, where the project utilizes an average land cover condition greater than 16% impervious cover in

the design of post-development stormwater management facilities, and that result in an increased pollutant load. The base is required to offset any additional pollutant loads due to Grandfathered Projects. The base has no Grandfathered Projects.

4.4 Future Grandfathered Project Loads

A list of future planned Grandfathered Projects and associated estimated total acreages is presented below in Table 4-6.

Table 4-6. Future Grandfathered Projects

Grandfathered Project Name	Total Acreage
Advanced Individual Training (AIT) Barracks (Phase 3)	13

4.5 Summary of Load Reduction Requirements

A summary of the JBLE-Eustis required load reductions is presented in Table 4-7. The values presented in this table represent the 5% reduction requirement to be achieved by the end of the first permit cycle (30 June 2018).

Table 4-7. Summary of the First Permit Cycle Required Load Reductions

Pollutant	First Permit Cycle Required Reductions (lb/yr)			
	Existing Sources	New Sources*	Grandfathered Projects	Total
Nitrogen	48.8	56.4	0.0	105.2
Phosphorus	10.1	5.8	0.0	15.8
Total Suspended Solids	4,317.2	1,385.4	0.0	5,702.6

Notes:

*Credits from BMPs installed during the New Sources timeframe have already been accounted for in this column

5.0 CREDIT CALCULATIONS (MEANS AND METHODS)

The Guidance Document outlines multiple options available to permittee's to meet the Chesapeake Bay TMDL pollutant reduction requirements. These options include post-construction BMPs, enhancement of existing BMPs, land use change BMPs, street sweeping programs, stream restoration and riparian buffers, and nutrient management plans. The base's current pollutant credit portfolio includes post-construction BMPs, street sweeping, and land use change to meet the 5% pollutant reduction requirement for the first permit cycle as noted in the subsections below. The load reduction credits were calculated using the methods presented in the Guidance Document.

5.1 Existing BMPs (Post-2006)

A GIS inventory of existing post-construction BMPs present at JBLE-Eustis and their drainage areas previously developed by Concurrent Technologies Corporation in 2013 was used to help calculate existing credits for the Action Plan. BMPs installed between 1 January 2006 and 30 June 2009 were included in this analysis. BMPs installed prior to 1 January 2006 are not eligible for credit and were thus excluded from consideration for this Action Plan. BMPs installed after 30 June 2009 were tracked separately to facilitate the calculation of New Source loads.

A two-step process using GIS and Excel was used to determine the pollutant credit for each BMP. Drainage areas for BMPs were delineated in ArcGIS and the layer was used to intersect the 2014 land cover layer. The 2014 land cover layer was selected as it better reflected current ground conditions. This produced a table denoting the land cover acreages within each BMP drainage area. The land cover acreages were multiplied by the land cover loading rates provided in Table 2a (for impervious and pervious lands) and Table III.1 (for forested lands) and then summed to determine the pollutant load attributed to the drainage area. The load was then multiplied by the pollutant removal efficiency for each BMP type to determine the load removed (i.e., credit). BMP efficiencies provided in Table V.C.1 of the Guidance Document were used for this analysis. The efficiency of some BMP types depends on the underlying hydrologic soil group (HSG). GIS data from the Web Soil Survey website (<http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>) was used to determine the soil group for each BMP. The above process was repeated for all three pollutants of concern.

The effect of BMP treatment trains (BMPs in series, where the effluent from an upstream BMP enters the drainage area of a downstream BMP) was also accounted for. The cumulative effect of BMPs in series will be less for a given pollutant than the sum of individual BMPs not in series. This is because the removal efficiency of a downstream BMP is applied to runoff that is cleaner.

One benefit of treatment trains is the potential to maximize the load removal efficiency across multiple pollutants of concern. For example, pairing an upstream BMP with a high sediment removal rate with a downstream BMP that carries a high nutrient removal rate may be an excellent use of available space in a developed area.

Credits for BMPs implemented on unregulated lands may be awarded, provided any necessary baseline is first met (see page 10 and Example V.E.1 of the Guidance Document). No credits are claimed for BMPs implemented on unregulated lands because the criteria for receiving credits were not achieved.

Part III.3 of the Guidance Document describes that permittees may not receive credit for BMPs that were installed after 1 July 2009 and that were implemented to meet the minimum VSMP technical criteria phosphorous removal requirement for new development or other minimum regulatory requirements. However, permittees may receive credit for those BMPs under circumstances of redevelopment, stricter development requirements, or oversized BMPs. BMPs installed after 1 July 2009 were included in this analysis when they were implemented under conditions of redevelopment, as described in Appendix V.E of the Guidance Document. Credits from BMPs implemented after 30 June 2009 were calculated separately in order to track net load change due to new source loads (refer back to Table 4-5). The effects of BMP treatment trains and unregulated land were also accounted for BMPs implemented during 2009-2014. Summaries of post-construction BMP types and credits are presented in Table 5-1 and Table 5-2, respectively.

Table 5-1. Summary of Existing BMP Types

BMP Type	Timeframe Implemented		Total
	1 Jan 2006 to 30 June 2009	1 July 2009 to 30 June 2014	
Bioretention	3	7	10
Dry Detention Pond	1	5	6
Dry Extended Detention Pond	1	10	11
Permeable Pavement	–	7	7
Swale	2	9	11
Wet Pond or Wetland	1	1	2
Total	8	39	47

Table 5-2. Summary of Credits From Existing Post-Construction BMPs

BMP Timeframe	Number of BMPs	Credits (lb/yr)		
		Nitrogen	Phosphorus	Total Suspended Solids
2006–2009	8	66.4	21.1	10,782.7
2009–2014	39	109.4	27.0	16,906.7

A map of existing post-construction BMP locations is presented as Figure 5-1.

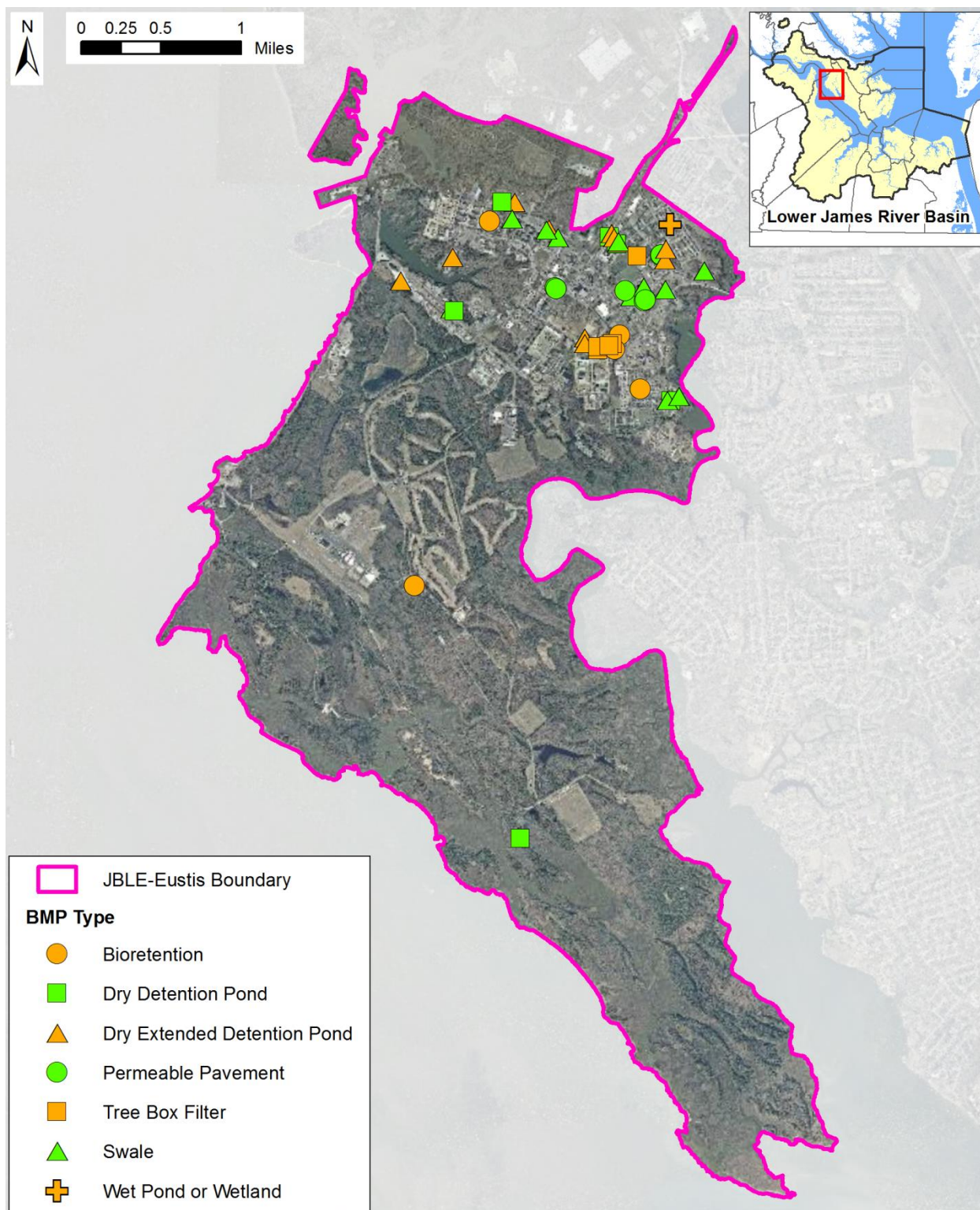


Figure 5-1. Map of Existing Post-Construction BMPs

5.2 Street Sweeping

The base uses a third-party contractor to sweep identified streets and parking lots on a regular basis. The base used the qualifying street lanes method (mechanical technology) described in Appendix V.G of the Guidance Document to calculate street sweeping credits. A summary of street sweeping credits is presented in Table 5-3.

Table 5-3. Summary of Annual Street Sweeping Credits

Lane-Miles Swept	Acres Swept	Credits (lb/yr)		
		Nitrogen	Phosphorus	Total Suspended Solids
1,147.5	1,390.9	856.8	111.3	180,821.5

A map of the streets serviced as part of the base’s street sweeping program is presented as Figure 5-2.

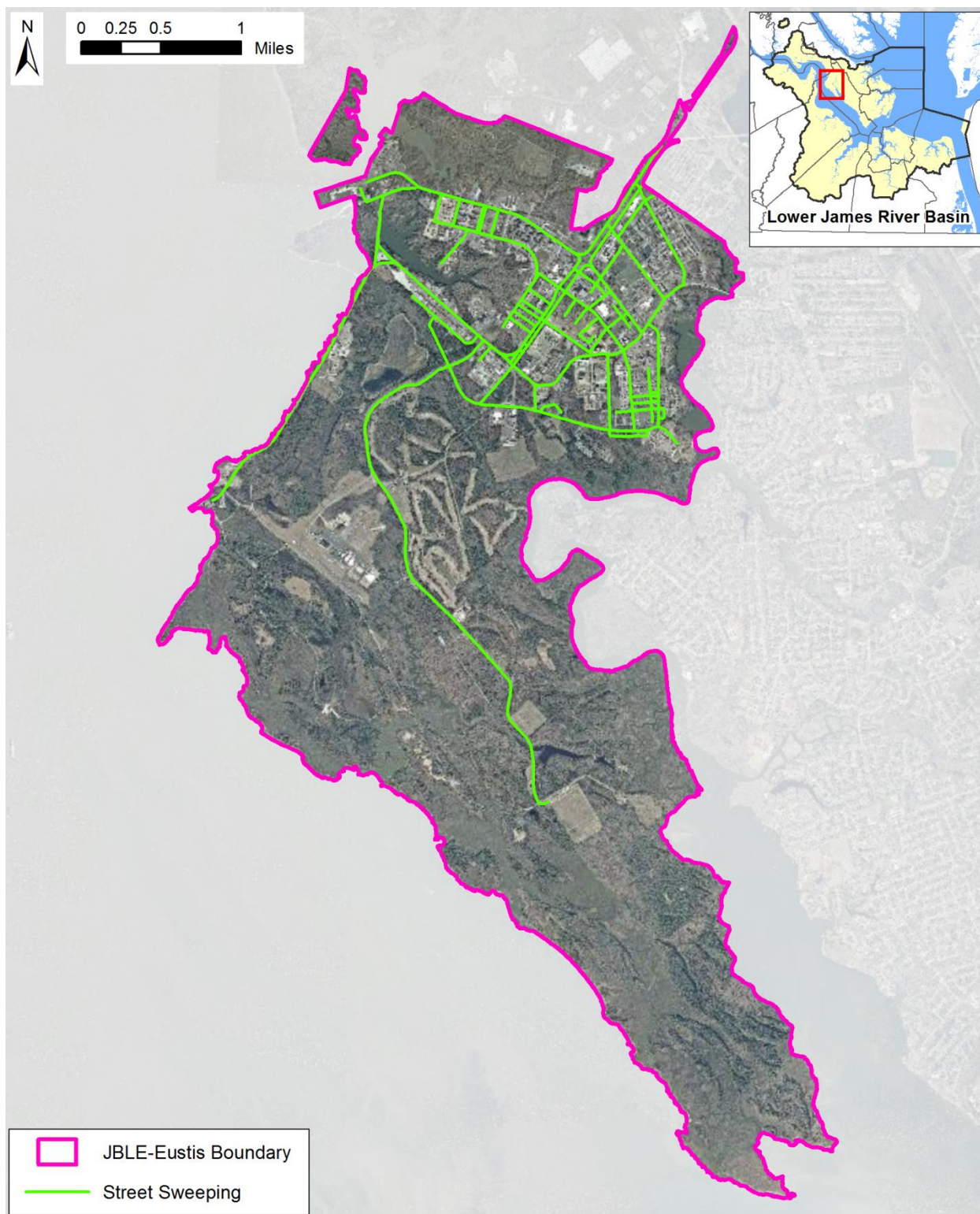


Figure 5-2. Map of Streets Swept

5.3 Land Use Change

The base has one land use change BMP, where trees have been planted on an existing pervious parcel. Currently the parcel does not meet the forested lands criteria outlined in the Guidance Document. Therefore, credit for “pervious to grass” land use change will be used for this parcel until the forested lands criteria is met. The base used the methods described in Appendix V.H of the Guidance Document to calculate land use change credits. A summary of land use change credits is presented in Table 5-4.

Table 5-4. Summary of Land Use Change Credits

Number of BMPs	Credits (lb/yr)		
	Nitrogen	Phosphorus	Total Suspended Solids
1	14.8	0.0	0.0

A map of the land use change BMP is presented as Figure 5-3.

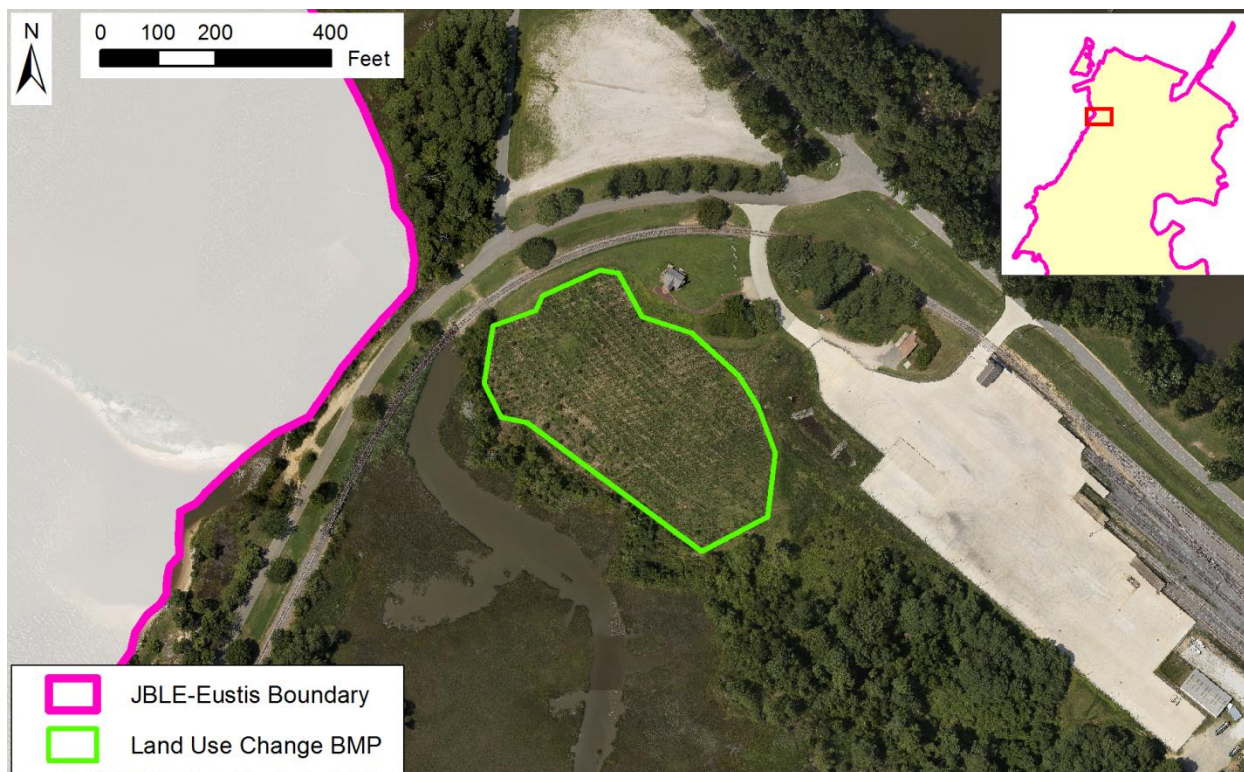


Figure 5-3. Map of Land Use Change BMPs

5.4 Future BMPs

The base will continue to investigate the applicability and feasibility of additional BMPs and BMP types in order to meet the pollutant load reduction requirements of the Chesapeake Bay TMDL. Opportunities for effective retrofit options will be explored and prioritized to make the best use of available resources.

5.5 BMP Costs

The current JBLE-Eustis pollutant credit portfolio includes post-construction BMPs, street sweeping, and land use change. The implementation cost for the structural BMPs and land use change is zero, as these BMPs are existing. The base uses a third-party contractor to sweep identified streets and parking lots on a regular basis. A summary of BMP implementation costs is presented in Table 5-5.

Table 5-5. Summary of BMP Implementation Costs

BMP Strategy	Implementation Costs
Post-construction BMPs	\$0
Land Use Change BMPs	\$0
Street Sweeping	TBD

5.6 Summary of Load Reduction Credits

A summary of pollutant credits by BMP strategy is presented in Table 5-6.

Table 5-6. Summary of Load Reduction Credits by BMP Strategy

Pollutant	Post-construction BMPs		Street Sweeping	Land Use Change
	Completed between 1 Jan 2006 and 30 June 2009	Completed after 1 July 2009		
Nitrogen	66.4	109.4	856.8	14.8
Phosphorus	21.1	27.0	111.3	0.0
Total Suspended Solids	10,782.7	16,906.7	180,821.5	0.0

6.0 PROGRESS SUMMARY

Section I.C of the MS4 Permit requires the base to meet the Chesapeake Bay TMDL requirements by reducing nitrogen, phosphorus, and total suspended solid loads by 5% of the Chesapeake Bay L2 scoping reductions by the end of the first permit cycle (30 June 2018). The base's load contribution, required load reductions, and pollutant credits outlined in this Action Plan were calculated using the methodology described in VDEQ's Guidance Document. A summary of the required load reduction is presented in Table 6-1 and first permit cycle pollutant credits is presented in Table 6-2.

Table 6-1. Summary of Permit Cycles 1, 2 and 3 Reduction Requirements

Pollutant	Required Load Reduction by 2018 (lb/yr)	Required Load Reduction by 2023 (lb/yr)	Required Load Reduction by 2028 (lb/yr)
Nitrogen	105.2	841.9	2,104.7
Phosphorus	15.8	126.5	316.3
Total Suspended Solids	5,702.6	45,621.1	114,052.8

Table 6-2. Summary of First Permit Cycle Reduction Requirements and Credits

Pollutant	First Permit Cycle Percent Reduction Requirement	Required Load Reduction by 2018 (lb/yr)	Credits from Existing BMPs (lb/yr)*	First Permit Cycle Target Met?
Nitrogen	5%	105.2	938.1	Yes
Phosphorus	5%	15.8	132.3	Yes
Total Suspended Solids	5%	5,702.6	191,604.2	Yes

* Does not include credits related to New Sources that were previously accounted for in Table 4-5 [Table II.5]

Assuming that the BMPs considered in this analysis are maintained and fully functional to provide the design performance, it is the conclusion of this analysis that the base currently meets their first permit cycle reduction requirement goals for all of the pollutants of concern. The base will continue to investigate the applicability and feasibility of additional BMPs and BMP types in order to meet the future milestone pollutant load reduction requirements of the Chesapeake Bay TMDL.

7.0 PUBLIC COMMENTS

The base encourages the public's participation in the development and implementation of this Chesapeake Bay TMDL Action Plan. In keeping with this objective, the base has uploaded this Action Plan to its website, <http://www.jble.af.mil/shared/media/document/AFD-151020-019.pdf>. Comments received will be taken into consideration when finalizing the Action Plan with VDEQ.

8.0 REFERENCES

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